

INDICATOR TUBE

Cold cathode ten digit numeral indicator tube for side viewing.

QUICK REFERENCE DATA			
Numeral height		30	mm
Numerals	1 2 3 4 5 6 7 8 9 0		
Supply voltage	V_{ba}	min. 170	V
Cathode current	I_k	4.5	mA

GENERAL

The numerals are 30 mm high and appear on the same base line allowing in-line read out. The ZM1040 is provided with a red contrast filter.

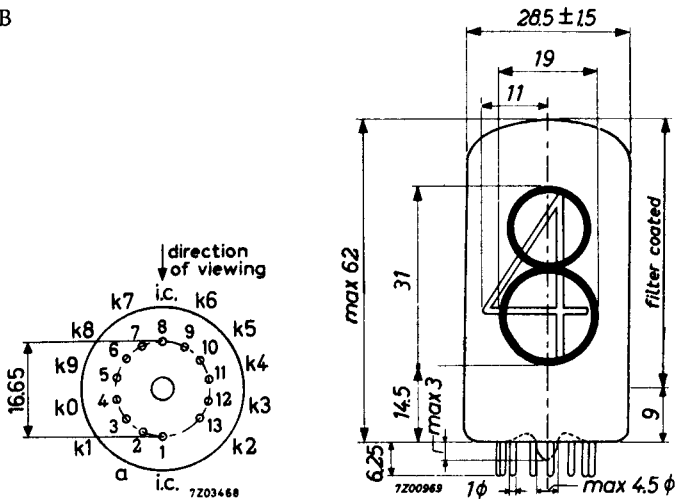
PRINCIPLE OF OPERATION

The tube contains ten cathodes in the form of ten figures and one common anode. By applying a suitable voltage between the anode and one of the ten cathodes the corresponding numeral will be covered by a red neon glow.

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: B13B



Mounting position: any

The numerals are viewed through the side of the envelope. The numerals will appear upright (within 1.5°) when the tube is mounted vertically.

Accessories

Socket type B870228 (B870067 or B870069)

CHARACTERISTICS AND OPERATING CONDITIONS

Ignition voltage	V_{ign}	max.	160	V
Maintaining voltage	V_m	see sheets A and B		
Cathode current for coverage, average, during any conduction period	I_k	min.	3	mA
Cathode current, average ($T_{av} = 20$ ms)	I_k	max.	6	mA
peak	I_{kp}	max.	20	mA
Cathode selecting voltage	V_{kk}	see sheets C and D		
Extinguishing voltage	V_{ext}	min.	120	V

Typical operation at temperatures $t_{amb} = 10$ to 50 °C

D.C. operation with or without V_{kk}

(See fig. 1 and 3 and sheets A, C and D)

Anode supply voltage	V_{ba}	200	250	300	350	V
Maintaining voltage	V_m	140 ± 10	140 ± 10	140 ± 10	140 ± 10	V
Anode series resistor	R_a	15	27	39	47	k Ω
Cathode selecting voltage	V_{kk}			min.	60	V ¹⁾

A.C. half-wave rectified operation with or without V_{kk}

(See fig. 2 and 4 and sheet B)

Secondary transformer voltage	V_{tr}	170	220	250	300	V
Anode series resistor	R_a	5.6	12	18	27	k Ω
Cathode selecting voltage	V_{kk}			min.	60	V ¹⁾

¹⁾ With low cathode selecting voltages the current I_{kk} to the "off" cathodes will increase and the readability of the "on" cathode will be affected. It is therefore recommended to use a voltage V_{kk} in excess off the stated minimum value.

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LIFE EXPECTANCY under recommended operating conditions

Continuous display of one digit	3000 h
Sequentially changing the display from one digit to the others every 100 hours or less	20 000 h

LIMITING VALUES (Absolute max. rating system)

Anode voltage necessary for ignition	V_a	min.	170 V
Cathode current,			
average during any conduction period	I_k	min.	3 mA
average ($T_{av} = 20$ ms)	I_k	max.	6 mA
peak	I_{kp}	max.	20 mA
Cathode selection voltage	V_{kk}	min.	60 V
Bias voltage between anode and "off" cathodes	V_{bias}	max.	120 V
Bulb temperature	ϑ_{bulb}	min.	0 °C
		max.	+70 °C ¹⁾

¹⁾ Bulb temperatures below 0 °C result in a reduced life expectancy and changes in characteristics (see sheet E)

In designing equipment to be used over a wide temperature range the use of "constant current operation" (high supply voltage with a high anode series resistor) is recommended.

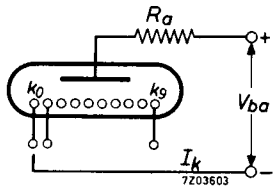


Fig.1

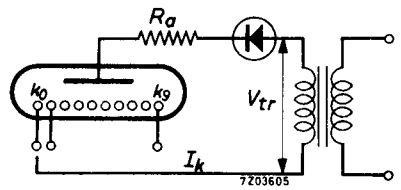


Fig.2

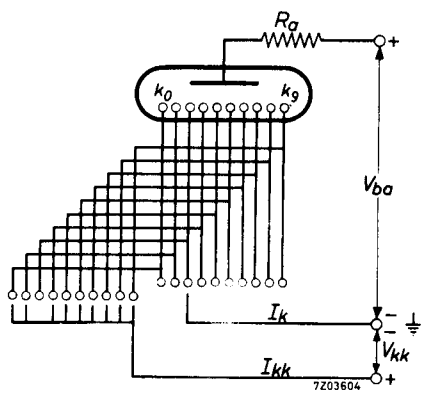


Fig.3

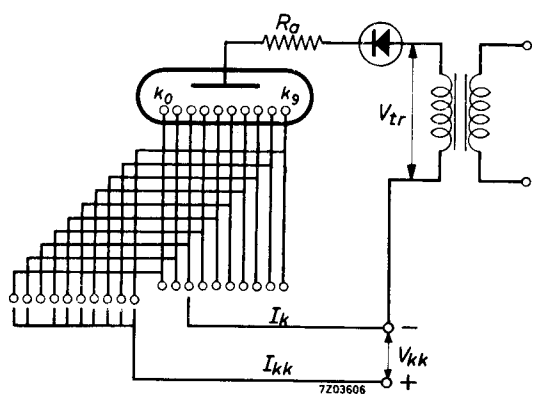
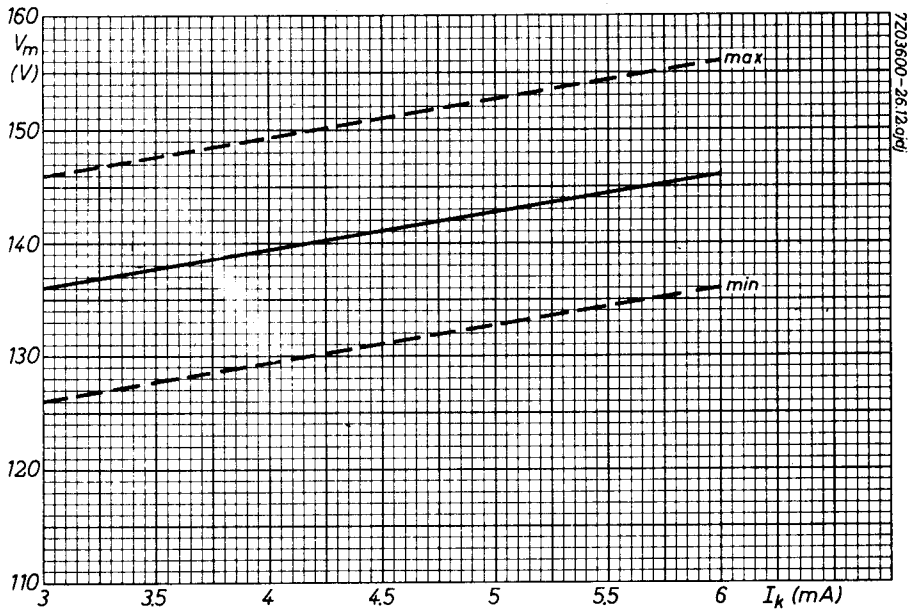
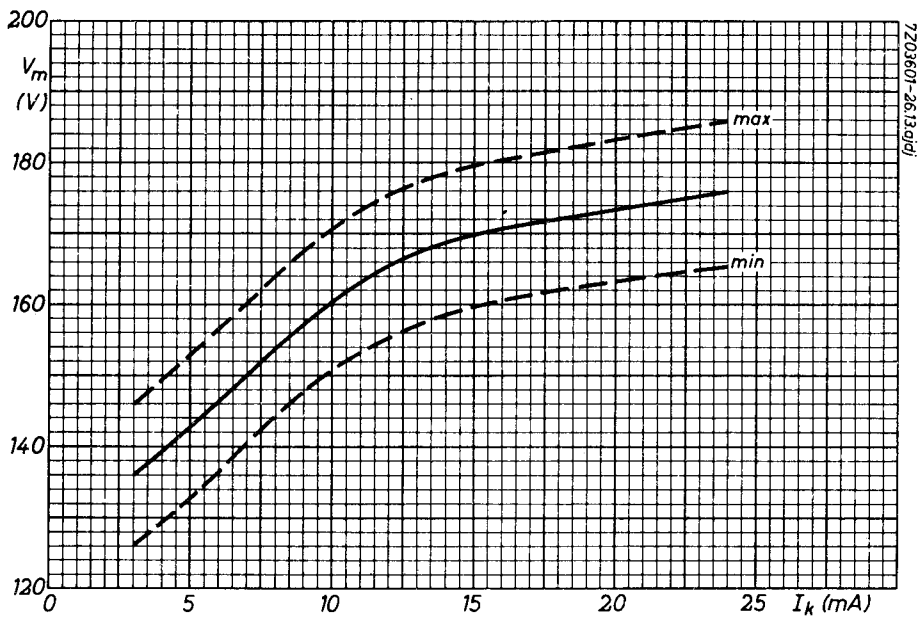
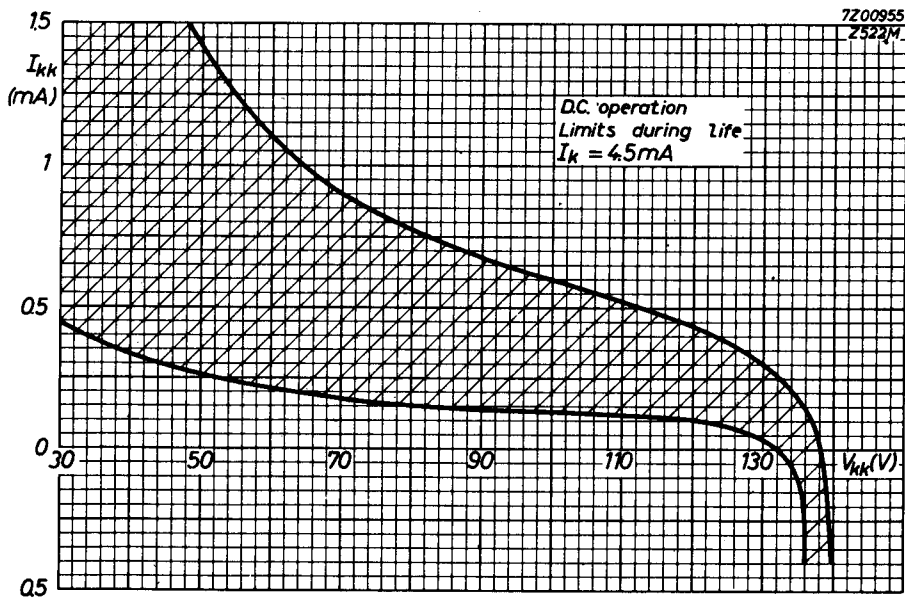
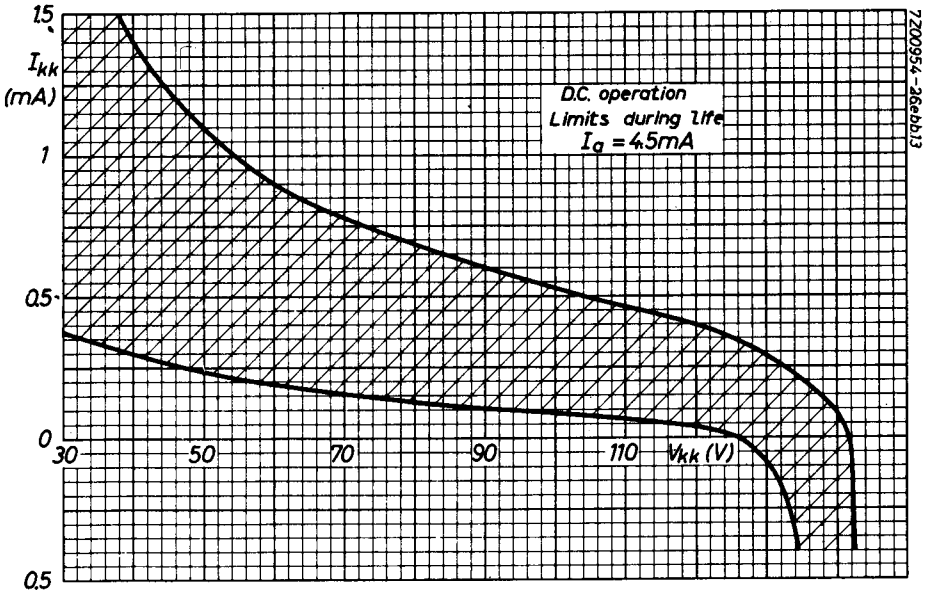


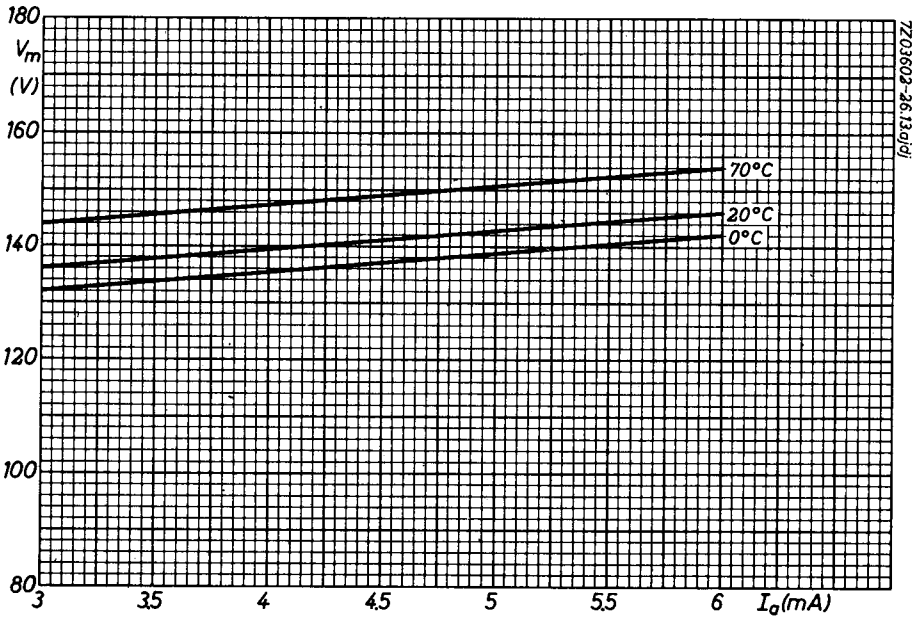
Fig.4











PHILIPS

Data handbook



Electronic
components
and materials

ZM1040

page	sheet	date
1	1	1966
2	2	1966
3	3	1966
4	4	1966
5	A	1966
6	B	1966
7	C	1966
8	D	1966
9	E	1966
10	FP	2000.02.03